REMARKS

Reconsideration of this application, as amended, is respectfully requested. The following remarks are responsive to the Office Action mailed October 7, 2002.

Objection to Specification

The Examiner has objected to the specification on page 4, line 7. Specifically, the Examiner has pointed out that there is a period missing after the words "poorly activated."

Applicants have amended the specification and respectfully request reconsideration and withdrawal of the §112 rejection. A marked-up version of the amended specification appears at the end of this Amendment.

Claim Rejection – 35 U.S.C. §112, Second Paragraph

The Examiner has rejected claim 3 under 35 U.S.C. §112, Second Paragraph, as being indefinite and failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Applicants have amended claim 3 and respectfully request reconsideration and withdrawal of the §112 rejection. A marked-up version of the amended claim appears at the end of this Amendment.

Claim Rejection – 35 U.S.C. §102(a)

The Examiner has rejected claims 1-6, 8, and 11 under 35 U.S.C. §102(a) as being anticipated by Wu (U.S. Patent 6,090,653).

Applicants respectfully traverse the rejection of these claims. In this Amendment, Applicants have amended Claim 1 to recite a method of nickel silicidation that includes in part:

> incorporating nitrogen into said processed substrate and annealing the processed substrate;
> depositing nickel onto said processed substrate after incorporating nitrogen into said processed substrate; and
> annealing said processed substrate so as to form nickel mono-silicide.

Accordingly, Claim 1 as amended anneals the process substrate after incorporating nitrogen into the processed substrate and deposits nickel onto the processed substrate after incorporating nitrogen and annealing the nitrogen incorporated processed substrate.

Wu ('653) states:

> Forming an oxide layer by annealing (Column 4, lines 1-6), depositing chemical vapor to form silicon nitrite layer (Column 4, lines 14-16), performing ion implantation to dope ions into substrate to form lightly doped drain structures (Column 4, lines 21-24), forming an oxide layer after the ion implantation (Figure 4, and Column 4, lines 30-31), forming another high dose of ion implantation at a tilt angle (Figure 5 and Column 4, lines 35-39), removing silicon cap layer (Figure 6 and Column 4, lines 56-57), depositing metal layer (Column 4, lines 60-63), and

subsequently annealing the substrate having a metal layer (Column 4, lines 64-66 and Column 5, lines 1-2).

I. THE CLAIMED INVENTION INCORPORATES NITROGEN INTO THE SUBSTRATE, ANNEALS THE NITROGEN INCORPORATED SUBSTRATE, AND THEN DEPOSITS NICKEL ON THE ANNEALED SUBSTRATE.

Amended Claim 1 recites a method of nickel silicidation that includes incorporating nitrogen into the substrate, annealing the nitrogen incorporated substrate, and then depositing nickel onto the annealed substrate. Unlike the claimed invention, Wu ('653) does not disclose, teach, or even suggest incorporating nitrogen into a substrate, annealing the nitrogen incorporated substrate and depositing nickel after the anneal. To the contrary, Wu ('653) deposits ions twice on a substrate and then performs two additional processes of removing a cap silicon layer and depositing a noble metal layer before annealing the substrate.

II. ANNEALING THE SUBSTRATE AFTER INCORPORATING NITROGEN REMOVES DEFECTS CAUSED BY THE NITROGEN IMPLANTATION.

Annealing after nitrogen deposition removes defects caused by nitrogen implantation (See Specification; Page 11, Lines 17-22). Defects may cause several types of damage including a non-uniform nickel salicide film after nickel deposition on the defected substrate or agglomeration after nickel deposition on the defected substrate. Post nitrogen deposition annealing cures the substrate of any defects and prepares the

substrate for further processes such as metal deposition (See Specification; Page 14, Lines 7-14).

In view of the foregoing remarks, since claims 2-6, 8 and 11 are dependent on patentably distinct claim 1, Applicants respectfully request reconsideration and withdrawal of the §102(a) rejection of claims 1-6, 8, and 11.

Claim Rejection – 7, 9, 10 and 12-14

The Examiner has rejected claims 7, 9, 10 and 12-14. For reasons mentioned above, Claim 1 is patentably distinct from the prior art. Since Claims 7, 9, 10 and 12-14 are dependent on patentably distinct Claim 1, Applicants respectfully request reconsideration and withdrawal of rejections of claims 7, 9, 10 and 12-14.

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If the Examiner believes a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact John Stattler at (650) 752-0990.

If there are any additional charges, please charge Deposit Account No. 50-1128.

Respectfully submitted,

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THE AMENDED SPECIFICATION

The following page provides the amended paragraph with the amendments marked with deleted material in [brackets] and new material underlined to show the changes made.

The following amended paragraph replaces the original paragraph starting on page 3, line 20 to page 4, line 7, of the specification:

--A fourth prior art process is described by L.W. Cheng et al., Thin Solid Films, 355-356, 412 (1999). In this process, a single crystal silicon substrate is implanted with nitrogen ions prior to doping the source/drain junction. Additional procedures including doping the source/drain junction, depositing nickel onto silicon, and annealing the sample are then performed. Nitrogen ion implantation is found to slow down dopant diffusion and delay transformation from nickel mono-silicide to nickel-disilicide during the high temperature annealing. The process controls dopant transport in shallow source/drain junctions in silicon, but does not improve silicidation of nickel on poly-silicon device structures such as gates. Furthermore, source/drain dopants (particularly Boron) were poorly activated.--

THE AMENDED CLAIMS

The following pages provide the amended claims with the amendments marked with deleted material in [brackets] and new material underlined to show the changes made.

1. (Currently Amended) A method of nickel [salicidation] silicidation comprising:

forming a processed substrate including partially fabricated integrated circuit components and a silicon substrate;

incorporating nitrogen into said processed substrate and annealing the processed substrate;

depositing nickel onto said processed substrate after incorporating nitrogen into said processed substrate; and

annealing said processed substrate so as to form nickel mono-silicide.

3. (Currently Amended) The method as claimed in claim 2, wherein said forming a processed substrate comprises:

forming dielectric regions in said silicon substrate that electrically isolate neighboring integrated circuit devices;

[at least on of n-type doping and p-type] doping a portion of said silicon substrate with an n-type and a p-type doping to form said source/drain structures;

depositing a gate dielectric material and a polycrystalline silicon gate material onto said silicon substrate and selectively etching; and

depositing a dielectric material onto said silicon substrate and selectively etching to form dielectric spacers.